GREENHOUSE GAS ASSESSMENT

Quarry Creek Mixed Use Development
City of Carlsbad, CA

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Project: 11121-06 Quarry Creek GHG Study

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EXECUTIVE SUMMARY

This analysis has been completed in order to quantify Greenhouse Gas (GHG) emissions from the project site and was prepared according to guidelines established within the California Global Warming Solutions Act of 2006 – Assembly Bill 32 (AB32), Senate Bill 97 (SB97), and California Environmental Quality Act (CEQA). Greenhouse Gasses analyzed in this study are Carbon Dioxide (CO_2), Methane (CH_4), and Nitrous Oxide (N_2O). To simplify greenhouse gas calculations, both CH_4 and N_2O are converted to equivalent amounts of CO_2 and are identified as CO_2e.

The project proposes the construction of a 656 unit residential development, a 2.5 acre nature/education center, a 1.5 acre community facilities site (daycare), a 1.3 acre park and ride site, and 72 acres of open space. All phases (i.e. mass grading, trenching, finish grading and construction) of the proposed Project are anticipated to start in 2014 with construction and opening of the first buildings sometime late 2015 and full Buildout in 2018

The proposed project will emit GHGs directly through the burning of carbon-based fuels such as gasoline and natural gas as well as indirectly through usage of electricity, water and from the anaerobic bacterial breakdown of organic solid waste. The proposed project would generate approximately 11,118.12 Metric Tons of CO_2e each year under business as usual, which exceeds California Air Pollution Control Officers Association's (CAPCOA) 900 Metric Ton per year thresholds and would require design features to reduce levels to below significant.

Regulatory measures such as the AB 1493 Pavley rules and California's Low Carbon Fuel Standards, Cal Green and EPA Energy Star or other equivalent building efficiencies, based on the latest available technologies reductions as well as incorporating neighborhood design features like adding bike baths and sidewalks will reduce CO_2e emission by up to 3,501.73 Metric Tons per year over Business as Usual (BAU). These CO_2e regulatory measures 31.50% which is higher than the State recommended 28.3% reductions and will exceed the requirements of CEQA. Therefore, the project conforms to the goals of AB 32 and would not result in any direct impacts and cumulative impacts would be reduced to a level that is less than significant.

1.0 INTRODUCTION

1.1 Purpose of this Study

The purpose of this Green House Gas Assessment (GHG) is to show conformance to the California Global Warming Solutions Act of 2006 – Assembly Bill 32 (AB32) and Senate Bill 97 (SB97). AB32 requires that by 2020 the state's greenhouse gas emissions be reduced to 1990 levels and SB97 a "companion" bill directed amendments to the California Environmental Quality Act (CEQA) statute to specifically establish that GHG emissions and their impacts are appropriate subjects for CEQA analysis. Should impacts be determined, the intent of this study would be to recommend suitable design measures to bring the project to a level considered less than significant.

1.2 Project Location

The project site is located south of and adjacent to State Route 78 just west of College Boulevard, within the northern portion of the City of Carlsbad CA. Access to the Project site is provided by Marron Road and Haymar Drive from College Blvd to the east of the project site. State Route 78 to College Blvd south provides regional access to the Project site. A general project vicinity map is shown in Figure 1–A on the following page.

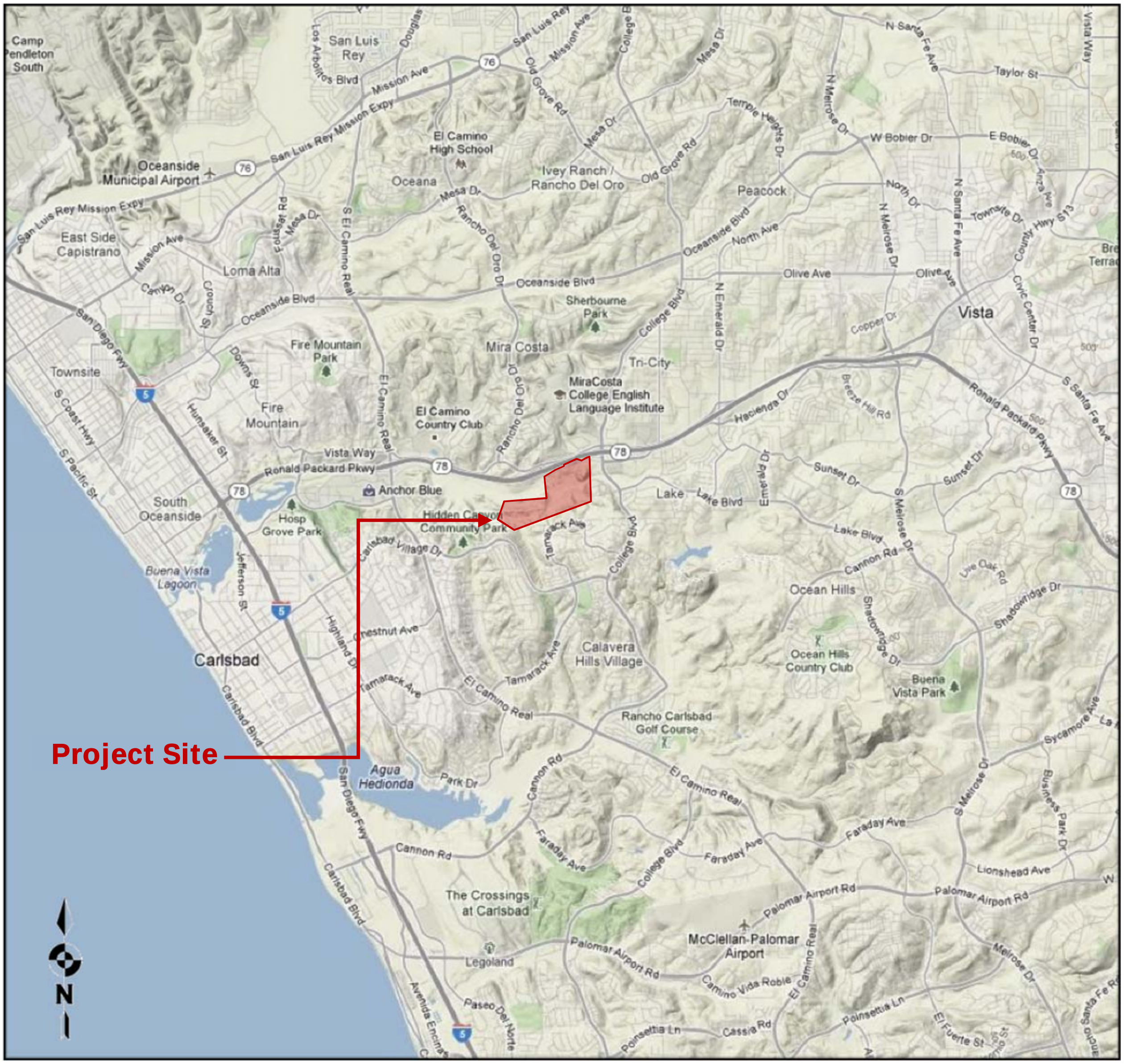
1.3 Project Description

The Project consists of a 656 unit residential development, a 2.5 acre nature/education center, a 1.5 acre community facilities site (daycare), a 1.3 acre park and ride site, and 72 acres of open space. High density residential (20 units per acre minimum) is proposed on the northerly side of the creek and residential medium high density (12 units per acre minimum) is proposed on the southerly side of the creek. The proposed project site, which is 155.38 acres, is shown in Figure 1–B on the following Page.

Grading of the proposed project will disturb roughly 74 acres of the 155.38 acre project site and would consist of clearing/grubbing, mass and finish grading and would be expected to last approximately five (5) months long. As part of that work, the project engineer also expects that blasting operations will be necessary. The blasting operations would occur over a 10-day period with seven days of rock drilling and three days of blasting. During this operation, grading operations will occur simultaneously. It's expected that the balanced earthwork quantities will be 610,000 CY with 27,000 CY developed from blasting.

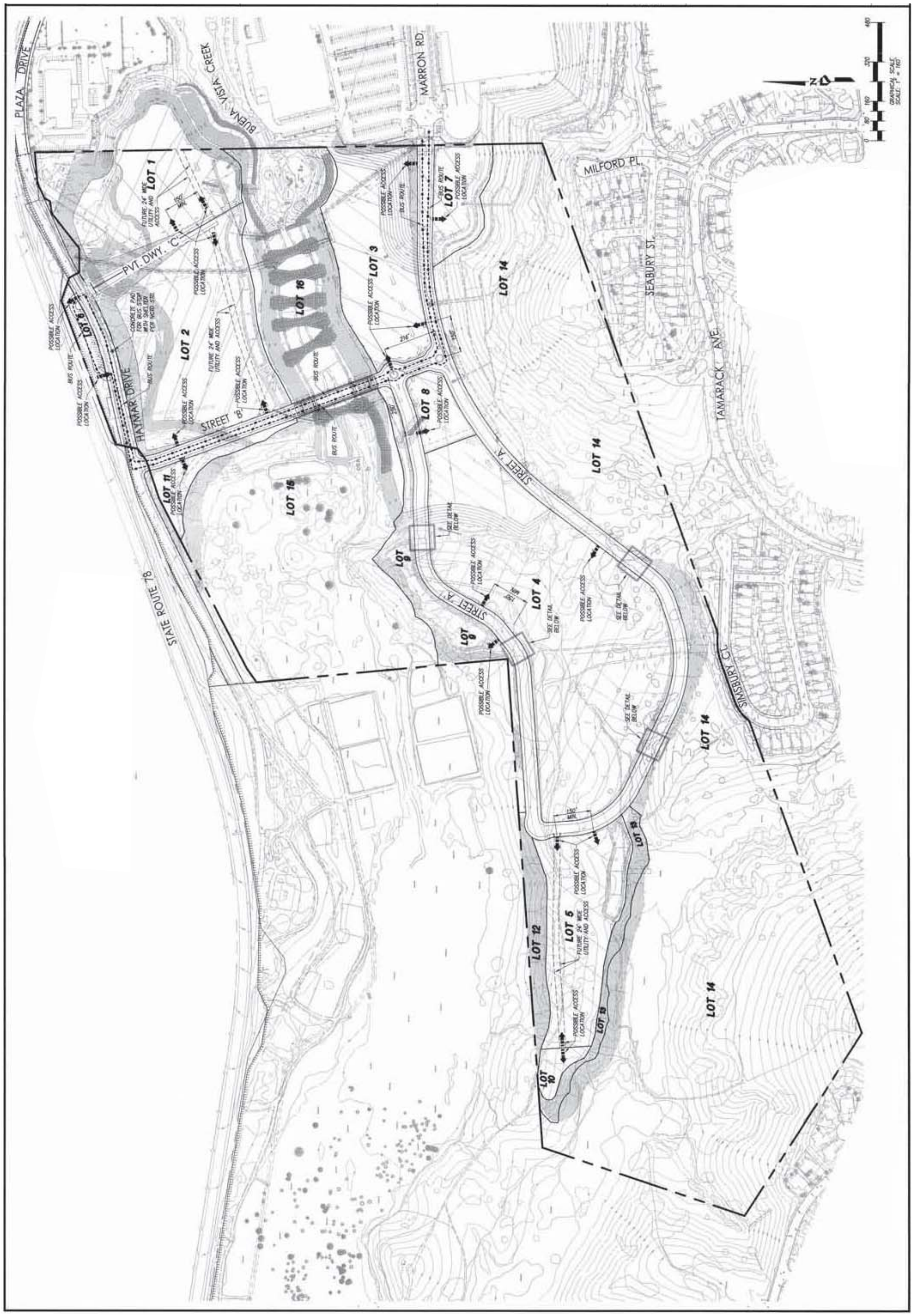
After grading is complete, the project would start the trenching operations for wet and dry utilities and would last approximately 225 working days following with the commencement of building construction which would begin a three year process of building out the remainder of the proposed development.

Figure 1-A: Project Vicinity Map



Source: Google Maps, 8/12

Figure 1-B: Proposed Project Site Plan



Source: Project Design Consultants, 7/12

2.0 EXISTING ENVIRONMENTAL SETTING

2.1 Understanding Greenhouse Gasses

Greenhouse gases such as water vapor and carbon dioxide are abundant in the earth's atmosphere. These gases are called "Greenhouse Gases" because they absorb and emit thermal infrared radiation which acts like an insulator to the planet. Without these gases, the earth ambient temperature would either be extremely hot during the day or blistering cold at night. However, because these gases can both absorb and emit heat, the earth's temperature does not sway too far in either direction.

Over the years as human activities require the use of burning fossil fuels stored carbon is released into the air in the form of CO_2 and to a much lesser extent CO. Additionally, over the years scientist have measured this rise in Carbon Dioxide and fear that it may be heating the planet too. Additionally, it is thought that other greenhouse gases such as Methane and Nitrous Oxide are to blame.

Greenhouse Gasses of concern as analyzed in this study are Carbon Dioxide (CO_2), Methane (CH_4), and Nitrous Oxide (N_2O). To simply greenhouse gas calculations, both CH_4 and N_2O can be converted to an equivalent amount of CO_2 or CO_2e. CO_2e is calculated by multiplying the calculated levels of CH_4 and N_2O by a Global Warming Potential (GWP). The U.S. Environmental Protection Agency publishes GWPs for various GHGs and reports that the GWP for CH_4 and N_2O is 21 and 310, respectively.

2.2 Existing Setting

The Project site lies in the northern portion of Carlsbad just south of State Route 78 which is also located in the San Diego Air Basin (SDAB). The site is generally represented by a diverse topography with elevations ranging from 65 feet to approximately 330 feet above mean sea level. Currently, the 155.38-acre site is mostly disturbed. Land uses surrounding the project site are mostly residential to the south and commercial/industrial to the east and west. The Project site is bordered by SR 78 to the north.

2.3 Climate and Meteorology

Climate within the San Diego Air Basin (SDAB) area often varies dramatically over short geographical distances with cooler temperatures on the western cost gradually warming to the east as prevailing winds from the west heats up. Most of southern California is dominated by high-pressure systems for much of the year, which keeps Carlsbad mostly sunny and warm. Typically, during the winter months, the high pressure system drops to the south and brings cooler, moister weather from the north.

It is common for inversion layers to develop within high-pressure areas, which mostly define pressure patterns over the SDAB. These inversions are caused when a thin layer of the atmosphere increases in temperature with height. An inversion acts like a lid preventing vertical mixing of air through convective overturning.

Meteorological trends within the Carlsbad area generally are very similar to that of nearby Oceanside where daytime highs typically range between 66ºF in the winter to approximately 79ºF in the summer with August usually being the hottest month. Median temperatures range from approximately 55ºF in the winter to approximately 72ºF in the summer. The average humidity is approximately 66% in the winter and about 73% in the summer (Source: http://www.city-data.com/city/Carlsbad-California.html). Carlsbad usually receives approximately 10.4-inches of rain per year with February being the wettest month (Source: http://www.weather.com /weather/wxclimatology/monthly/graph/USCA0182).

3.0 CLIMATE CHANGE REGULATORY ENVIRONMENT

3.1 AB 1493 (Pavley) Standards

Assembly Bill 1493 was California's first bill which was approved by the Governor in 2002 and was designed to reduce greenhouse gases within the state of California. It required the State Board do develop and adopt motor vehicle regulations to cost effectively reduce greenhouse gasses by January 1, 2005 and start enforcing them a year later. Furthermore, the state board shall develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of greenhouse gas emissions from motor vehicles.

3.2 Regulatory Standards (Assembly Bill 32)

The Global Warming Solutions Act of 2006 (AB 32), requires that by 2020 the State's greenhouse gas emissions be reduced to 1990 levels or roughly a 28.3% reduction. Significance thresholds have not been adopted but are currently being discussed. AB 32 is specific as to when thresholds shall be defined. The pertinent Sections are referenced within Part 4 of AB 32 Titled *Greenhouse Gas Emissions Reductions* are shown below:

Section 38560.5 (b) states:

On or before January 1, 2010, the state board shall adopt regulations to implement the measures identified on the list published pursuant to subdivision (a).

Section 38562 states:

(A) On or before January 1, 2011, the state board shall adopt greenhouse gas emission limits and emission reduction measures by regulation to achieve the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions in furtherance of achieving the statewide greenhouse gas emissions limit, to become operative beginning on January 1, 2012.

(B) In adopting regulations pursuant to this Section and Part 5 (commencing with Section (38570), to the extent feasible and in furtherance of achieving the statewide greenhouse gas emissions limit, the state board shall do all of the following:

1. *Design the regulations, including distribution of emissions allowances where appropriate, in a manner that is equitable, seeks to minimize costs and maximize the total benefits to California, and encourages early action to reduce greenhouse gas emissions.*
2. *Ensure that activities undertaken to comply with the regulations do not disproportionately impact low-income communities.*

3. *Ensure that entities that have voluntarily reduced their greenhouse gas emissions prior to the implementation of this Section receive appropriate credit for early voluntary reductions.*
4. *Ensure that activities undertaken pursuant to the regulations complement, and do not interfere with, efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminant emissions.*
5. *Consider cost-effectiveness of these regulations.*
6. *Consider overall societal benefits, including reductions in other air pollutants, diversification of energy sources, and other benefits to the economy, environment, and public health.*
7. *Minimize the administrative burden of implementing and complying with these regulations.*
8. *Minimize leakage.*
9. *Consider the significance of the contribution of each source or category of sources to statewide emissions of greenhouse gases.*

(C) In furtherance of achieving the statewide greenhouse gas emissions limit, by January 1, 2011, the state board may adopt a regulation that establishes a system of market-based declining annual aggregate emission limits for sources or categories of sources that emit greenhouse gas emissions, applicable from January 1, 2012, to December 31, 2020, inclusive, that the state board determines will achieve the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions, in the aggregate, from those sources or categories of sources.

(D) Any regulation adopted by the state board pursuant to this part or Part 5 (commencing with Section 38570) shall ensure all of the following:

1. *The greenhouse gas emission reductions achieved are real, permanent, quantifiable, verifiable, and enforceable by the state board.*
2. *For regulations pursuant to Part 5 (commencing with Section 38570), the reduction is in addition to any greenhouse gas emission reduction otherwise required by law or regulation, and any other greenhouse gas emission reduction that otherwise would occur.*
3. *If applicable, the greenhouse gas emission reduction occurs over the same time period and is equivalent in amount to any direct emission reduction required pursuant to this division.*

3.3 Regulatory Standards (Senate Bill 97)

SB 97 requires the Office of Planning and Research (OPR) to prepare and transmit to the Resources Agency, guidelines and directed amendments to the CEQA statute specifically for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions.

3.4 AB 1493 (Pavley Standards)

AB 1493 regulations are similar to CAFE Standards however are expected to produce a Greenhouse Gas Benefit greater to that of the CAFE Standard and would be expected to double the amount of GHGs saved under CAFE. The Pavley rules or also referred to as California Standards are designed to regulate GHG emissions while the federal standards are aimed at reducing the nation's fuel consumption.

Under Pavley starting with vehicles produced in 2009, manufactures have the flexibility in meeting California standards through a combination of reducing tailpipe emissions of Carbon Dioxide, Nitrous Oxide, Methane and hydrofluorocarbons from vehicle air conditions systems. Furthermore, the California standards are estimated to increase fuel efficiency to 43 miles per gallon by 2020. The 2020 reductions are based on a more stringent emission limit than the current California Standards, Called the Pavley 2 Rule, as set forth in the California Climate Action Plan and committed to by the ARV in its Early Action Measures under AB32.

CARB staff recommends through example the use of more stringent emission reduction beginning in 2017 as well as applying more stringent standards through 2020. The percent reductions will be further discussed in the methodology Section of this report. *(Source: Comparison of Greenhouse Gas Reduction for the United States and Canada under U.S. CAFE Standards and California Air Resources Board Greenhouse Gas Regulations – 2/2008)* otherwise referred to as CARB's Enhanced Technical Assessment on the relationship between CAFE standards and Pavley Standards.

This report utilized a baseline year of 2002 and calculated cumulative baseline equivalent GHG Reductions based on Pavley standards. One conclusion of the study finds that Pavley reductions are as high as 20% from 2002 levels. Also, it should be noted that reductions under Pavley were not assumed from 2002 through 2008. In 2009 Pavley regulations went into effect and become more stringent with time which will require automobile companies to produce vehicles that generate less GHG emissions each year. The 20% reduction is calculated based on the fact that the overall baseline emissions over the 18 years averages out to 496,200 tons per day and cumulative reductions under Pavley reduce up to 100,500 tons per day or a 20% reduction. Table 3.1 on the following page is a general duplicate of Table 11 within the CARB Enhanced Technical Assessment.

Table 3.1: Equivalent Emission Reductions from Adopted Pavley 1 and 2 Regulations in 2020

	PC/LDT1 (1000 tons per day)			LDT2 (1000 tons per day)		
Model Year	Baseline	%GHG Reduction	Tons Reduced	Baseline	%GHG Reduction	Tons Reduced
2008 and Older	80.19	0.0%	0.00	72.4	0.0%	0.00
2009	10.09	0.0%	0.00	7.49	0.9%	0.07
2010	11.17	3.5%	0.39	7.71	5.2%	0.40
2011	12.25	14.4%	1.76	7.98	12.0%	0.96
2012	13.46	25.3%	3.41	8.52	18.5%	1.58
2013	14.79	27.2%	4.02	9.35	19.9%	1.86
2014	15.95	28.8%	4.59	9.91	21.0%	2.08
2015	17.33	31.7%	5.49	10.89	23.0%	2.50
2016	18.25	34.3%	6.26	11.27	25.1%	2.83
2017	20.05	37.5%	7.52	12.43	30.0%	3.73
2018	22.12	40.7%	9.00	13.84	35.7%	4.94
2019	25.25	42.3%	10.68	15.76	39.1%	6.16
2020	29.37	43.9%	12.89	18.36	40.2%	7.38
Total	290.27		66.03	205.91		34.49
Grand Total	Baseline			496.2		
	Total Reduction			100.5		

3.5 Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 (P.L. 110-140, H.R. 6) is an energy policy law adopted by congress which consists mainly of provisions designed to increase energy efficiency and the availability of renewable energy. The law will require automakers to boost fleet wide gas mileage averages from the current 25 mpg to 35 mpg by 2020, which will reduce energy needs by 28.5%. This fleet wide average is known as the Corporate Average Fuel Economy (CAFE) standard.

CAFE Standards are similar to requirements developed within AB 1493 regulations however would not reduce greenhouse gas levels as quickly. The United States Environmental Protection Agency (U.S. EPA) denied the state of California from implementing AB 1493.

3.6 Executive Order S-01-07

Executive Order S-01-07 was signed by Governor Arnold Schwarzenegger in January 2007 and is effectively known as the Low Carbon Fuel Standard or LCFS. The executive order seeks to reduce the carbon intensity of California's passenger vehicle fuels by at least 10% by 2020. The LCFS will require fuel providers in California to ensure that the mix of fuel they sell into the California market meet, on average, a declining standard for GHG emissions measured in CO_2e grams per unit of fuel energy sold.

3.7 California Environmental Quality Act (CEQA) Significance Thresholds

As directed by SB 97, the Natural Resources Agency adopted Amendments to Title 14 Division 6 Chapter 3 CEQA Guidelines for greenhouse gas emissions on December 30, 2009. On February 16, 2010, the Office of Administrative Law approved the Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The amendments became effective on March 18, 2010. The pertinent Sections are shown below:

Section 15064.4 - Determining the Significance of Impacts from Greenhouse Gas

(A) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in Section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:

1. *Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use. The lead agency has discretion to select the model or methodology it considers most appropriate provided it supports its decision with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use; and/or*
2. *Rely on a qualitative analysis or performance-based standards.*

(B) A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:

1. *The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;*
2. *Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.*
3. *The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of*

greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

General Questions recommended within the environmental checklist are:

(a) Will the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

(b) Will the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

3.8 Greenhouse Gas Thresholds of Significance

As directed by SB 97, the Natural Resources Agency adopted Amendments to Title 14 Division 6 Chapter 3 CEQA Guidelines for greenhouse gas emissions on December 30, 2009. On February 16, 2010, the Office of Administrative Law approved the Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The amendments became effective on March 18, 2010. The pertinent Sections are shown below in Table 3.2.

Table 3.2: Adopted Discretionary Measures

Row #	Scoping Plan Measure	Measure #	Page #
1	Ship Electrification at Ports	T-5	C-66
2	Limit High GWP Use in Consumer Products	H-4	C-179
3	Heavy-Duty Vehicle GHG Emission Reduction	T-7	C-73
4	Motor Vehicle Air Conditioning Systems: Reduction of Refrigerant Emissions from Non-Professional Servicing	H-1	C-175
5	SF6 Limits in Non-Utility and Non-Semiconductor Applications	H-2	C-176
6	Reduction of Perfluorocarbons in Semiconductor Manufacturing	H-3	C-177
7	Tire Pressure Program	T-4	C-63
8	Low Carbon Fuel Standard	T-2	C-64
9	Landfill Methane Control Measure	RW-1	C-160

Additionally, as stated in Section 38562-A of AB 32, the state board adopted greenhouse gas emission limits and emission reduction measures on January 1, 2011 and began enforcing them on January 1, 2012. Currently, greenhouse gas emission limits for residential project such as the proposed project have not been adopted, however, Section 38562-B-3 encourages projects producing large quantities of GHGs to voluntarily identify greenhouse gas reductions and receive appropriate credit for early voluntary reductions.

The California Air Pollution Control Officers Association (CAPCOA) published a white paper, which suggested a screening criterion of 900 metric tons per year of GHGs and require all projects producing more than 900 metric tons per year of GHGs produce an inventory of project gases and demonstrate reasonable mitigation measures necessary to reduce GHG's by 28.3% from business as usual (BAU). BAU is the projected emissions that would have been generated without implementation of regulatory standards under AB 32.

4.0 METHODOLOGY

4.1 Construction CO_2e Emissions Calculation Methodology

Grading of the proposed project will disturb roughly 74 acres of the 155.38 acre project site and would consist of clearing/grubbing, mass and finish grading and would be expected to last approximately five (5) months long. As part of that work, the project engineer also expects that blasting operations will be necessary. The blasting operations would occur over a 10-day period with seven days of rock drilling and three days of blasting. During this operation, grading operations will occur simultaneously. It's expected that the balanced earthwork quantities will be 610,000 CY with 27,000 CY developed from blasting.

After grading is complete, the project would start the trenching operations for wet and dry utilities and would last approximately 225 working days following with the commencement of building construction which would begin a three year process of building out the remainder of the proposed development.

The project is expected to perform three (3) separate blasts which would include all the drilling necessary to place approximately 8,000 – 10,000 lbs of Ammonium Nitrate. It's expected that drilling would occur for seven days and then 3 days of blasting. This operation would be expected during mass grading operations. Table 4.1 on the following page shows the expected timeframes for the construction processes for all the project infrastructure, facilities, improvements and residential structures at the proposed project location.

For ammonium nitrate and fuel oil (ANFO) mixtures it is expected that carbon monoxide would be generated in quantities of 67 lbs per every ton of explosives and nitrogen oxides would be generated at 17 lbs per the same quantity (Source: EPA-AP 42, Fifth Edition Compilation of Air Pollutant Emission Factors - www.epa.gov/ttn/chief/ap42/ch13/final /c13s03.pdf).

The proposed project is expected to use about 5 tons of explosives for three days and would add an additional 156.78 lbs per day or 470.34 lbs total of NOx. In terms of CO_2e, multiplying the 470.34 lbs by 310 yields 145,805.4 lbs or 72.90 tons or 65.09 metric tons of CO_2e. Combining this with the expected construction emissions of 6,159.32 metric tons as calculated by URBEMIS brings the construction CO_2e emissions to 6,224.41 metric tons.

Table 4.1: Expected Construction Equipment

Equipment Identification	Proposed Start	Proposed Completion	Quantity
Mass Site Grading	1/1/2014	2/23/2014	
Scrapers			8
Water Trucks			3
Other General Industrial Equipment			2
Rubber Tired Dozers			2
Graders			1
Mass Site Grading w/ Blasting	2/24/2014	3/7/2014	
Off Highway Trucks			6
Bore/Drill Rigs			3
Water Trucks			2
Excavators			1
Graders			1
Other Material Handling Equipment			1
Rubber Tired Dozers			1
Tractors/Loaders/Backhoes			1
Fine Site Grading	3/8/2014	5/31/2014	
Scrapers			8
Water Trucks			3
Other Material Handling Equipment			2
Rubber Tired Dozers			2
Graders			1
Trenching	6/1/2014	4/1/2015	
Excavators			2
Tractors/Loaders/Backhoes			2
Other General Industrial Equipment			1
Water Trucks			1
Paving	2/15/2015	4/1/2015	
Cement and Mortar Mixers			4
Paving Equipment			2
Graders			1
Pavers			1
Rollers			1
Scrapers			1
Tractors/Loaders/Backhoes			1
Water Trucks			1
Building Construction	4/1/2015	10/1/2018	
Welders			3
Forklifts			2
Tractors/Loaders/Backhoes			2
Aerial Lifts			1
Cranes			1
Generator Sets			1
Rough Terrain Forklifts			1
Architectural Coating (Phase II)	7/1/2015	10/1/2018	

This equipment list is based upon equipment inventory within URBEMIS2007. The quantity and types are based upon assumptions from Projects of similar size and scope in the County of San Diego.

Blasting operations usually require a chemical material that is capable of extremely rapid combustion resulting in an explosion or detonation. These materials are usually mixtures of several ingredients but are often oxygen deficient as combustion reactions takes place which causes a formation of carbon monoxide and also to a lesser extent nitrogen oxides.

GHG impacts related to construction will be calculated using the latest URBEMIS2007 air quality model, which was developed by the California Air Resource Board (CARB). URBEMIS2007 has been approved by the San Diego Air Pollution Control District (SDAPCD) and the City for construction emission calculations. Additionally, CO_2e emissions generated from blasting will be added to the URBEMIS output. URBEMIS incorporates emission factors from the EMFAC2007 model for on-road vehicle emissions and the OFFROAD2007 model for off-road vehicle emissions. Because CO_2 emissions from construction only occur at the beginning of a project, emissions will be averaged over a 30-year period. This recommendation was based on proposals from South Coast Air Quality Management District in 2008.

4.2 Operational Vehicular Emissions Calculation Methodology

Operational Emissions from daily trips and area sources will be calculated utilizing emission levels reported in grams/mile from the EMFAC2007 emission model and will be customized to incorporate project specific Vehicle Miles Traveled (VMTs). All emission levels will then be multiplied by the annual mileage and then converted to metric tons for typical reporting consistency. The equation below will be utilized to determine the metric tons:

$$GHG(Metric\ Tons) = Emission\ Factor\left(\frac{g}{mile}\right) \times Annual\ Mileage \times .000001\left(\frac{Metric\ ton}{g}\right)$$

4.3 Electricity Usage Calculation Methodology

Utilizing methodologies within the California Climate Action Registry General Reporting Protocol Version 3.1- January 2009 (CCARGRPV3.1) CO_2, CH_4, and N_2O from electricity use can be calculated utilizing equations III.6b which is shown below:

Equation III.6b (GHG = CO_2, or CH_4, or N_2O)

$$GHG(Metric\ Tons) = \frac{Electricity\ Use\ (kWh) \times Electricity\ Emission\ Factor\ \left(\frac{lbs\ GHG}{kWh}\right)}{2{,}204\ \frac{lbs}{metric\ ton}}$$

The electricity emission factors are published within Table C.2 within the CCARGRPV3.1 document and are broken out into sub region. The proposed project is located within California and for CO_2, CH_4, and N_2O the Electricity Emission Factors are 0.72412, 0.0000302 and 0.0000081, respectively.

CO_2e generated from offsite sources in the production of electricity is much more difficult to mitigate however, the state and the utility companies are taking steps to become more energy efficient and utilizing renewable non-carbon based energy sources. The goals of SDGE (the proposed projects provider) are suggesting that 33% of the energy supplied to their customers would be from renewable sources. Under the BAU percentage reduction strategy of this report it is assumed that the utilities will increase renewable by up to 29% over the BAU starting period.

Furthermore, the Environmental Protection Agency and the US Department of Energy recommend building homes and habitable areas to achieve Energy Star compliance. Energy Star compliant homes are at least 15% more energy efficient than homes built to the 2004 International Residential Code (IRC), and by including additional energy-saving features, a 20–30% more energy efficient home is over a typical standard home is plausible (Source: www.energystar.gov). These reduction methodologies could also be incorporated into commercial buildings by utilizing the natural lighting, utilizing white roofs, and reducing heating and cooling requirements by providing good insulation in the buildings.

These reduction measures work together with California's Energy Efficiency Standards for Residential and Nonresidential Buildings otherwise known as Title 24 standards. The latest Cal Green standards went into effect in 2011 and it is estimated that implementation of the standards which incorporate Energy Star compliance or other equivalent building efficiencies would produce at least a 20% reduction over BAU. However for purposes of GHG calculations only a 20% total reduction will be applied.

4.4 Natural Gas Usage Calculation Methodology

CO_2e generated from stationary combustion such as water heaters, stoves, pool heaters, and clothing dryers can be calculated for CO_2, CH_4, and N_2O utilizing equations III.8b within the CCARGRPV3.1 document as shown below:

Equation III.8b (GHG= CO_2, or CH_4, or N_2O)

$$GHG(Metric\ Tons) = \frac{Natrual\ Gas\ Emission\ Factor\ \left(\frac{kg\ GHG}{MMBtu}\right) \times Fuel\ Consumed\ (MMBTu)}{1{,}000\frac{kg}{metric\ ton}}$$

The natural gas emission factors are published within Table C.7 and C.8 within the CCARGRPV3.1 natural gas emission factors for CO_2, CH_4, and N_2O are 53.06, 0.005 and 0.0001, respectively. These natural gas emission factors are inserted into equation III.8b and were published by CCARGRPV3.1.

Natural Gas generation rates per residential dwelling unit were obtained from the South Coast Air Quality Management District's CEQA Air Quality Handbook dated 1993. Similarly to that of electricity usage, the proposed firehouse was modeled as a multi-family residential use.

4.5 Solid Waste Emissions Calculation Methodology

Solid waste generated from the proposed project will ultimately be discarded as trash and then deposited into a landfill. The decomposition of organic matter such as food, paper, yard trimmings and wood are anaerobicly digested by bacteria which primarily produces GHG's as a bi-product. However, organic decomposition occurs at different rates and is a function of the material content. The Environmental Protection Agency (EPA) published various emission rates with units of Metric Tons of Carbon Dioxide Equivalent per Ton (Source: Solid Waste management and Greenhouse Gases; A Life-Cycle Assessment of Emissions and Sinks).

Average waste generation mixes vary between land uses. However, CAPCOA has published data from CalRecycle by region which estimates 0.46 tons of trash per person is generated for multi-family developments and 0.41 tons per person in single family homes within San Diego. Also, it is estimated that an average of 2.349 residents will occupy each dwelling unit. Therefore, the residential component of the project is expected to generated 814.98 tons per year.

The project traffic study indicates that the proposed daycare facility will generate 150 trips per day. The ITE Traffic Generation Manual indicates that a project of this size would generate roughly 28.3 trips per daycare employee which means the proposed daycare facility could have up to 5.3 employees or roughly 6 employees. Waste generation rates for daycare facilities isn't exactly clear however it was assumed that daycare facilities generate waste equivalent to Education Institutions which generate on average 0.12 tons/employee/year (Source: http://www.calrecycle.ca.gov/wastechar/WasteGenRates/Institution.htm). Therefore, using the unit of employees, the Project would be expected to generate around 1.01 tons of waste per year. Given this it is expected that the Project could produce 815.99 tons of waste each year.

Table 4.2 below identifies the typical mix ratio of waste by land use (Source: California 2008 Statewide Waste Characterization Study – Cascadia Consulting Group, 2009). Also, given that the project is primarily residential in nature, all waste sources would be expected to be broken down by percentage as residential waste. The best way to reduce these generation rates is to promote recycling.

Table 4.2: Average Waste Breakdown and Emission Rates

Waste Type	Residential Waste Breakdown	Landfill Emission Factors ($MTCO_2e$ per Ton)
Special Waste	1.5%	0.42
Mixed Residue	2.5%	0.04
Paper	19.6%	0.35
Glass	2.4%	0.04
Metal	4.0%	0.04
Electronics	0.7%	0.04
Plastic	9.2%	0.04
Other Organics	48.6%	0.24
Inert and Other	11.2%	0.04
Household Hazardous Waste (HHW)	0.3%	0.40

4.6 Water Use Emission Calculation Methodology (Offsite Pumping)

Water used from the proposed project will indirectly utilize energy for preparation and conveyance of clean water to the project site. It is estimated that it takes 13,022 kWh/Million Gallons (MG) of energy to deliver treated potable water which also includes the energy required to treat that water within a treatment facility (Source: CAPCOA – Quantifying Greenhouse Gas Mitigation Measures - 8/10). Similarly it is estimated that potable water delivered for outdoor uses would only use 11,111 kWh/MG. Energy consumption for outdoor purposes utilize less energy due to the fact that further treatment of the water is not required. Total energy consumption for all the land uses is then summed up to further calculate total emissions through the use of Equation III.6b as discussed in Section 4.3 above.

Water demand from the proposed project is expected to be as high as 180,900 GPD or 66,028,500 Gallons annually (Source: Water Supply Assessment and Verification Report for Quarry Creek Project. March 26, 2012). The project applicant also estimates that the effluent generation for the proposed project would be as high as 149,600 GPD or 54,604,000 Gallons annually.

Given both the potable demand and effluent generation, the entire project could require as much as 837,990.91 kWh of electricity per year. Also, as described in Section 4.3 of this report, SDGE (the energy supplier for the water districts) will increase the source of renewable energy sources by an additional 29% which would decrease GHGs produced through the conveyance of water and will be considered within the water use calculations.

4.7 Wastewater Generation Emission Calculation Methodology

An additional component of GHGs comes from project generated wastewater. The waste then is broken down by bacteria creating CH_4 and Oxides of Nitrogen. The aforementioned CAPCOA report on greenhouse gas mitigation estimates that the CH_4 created from project generated wastewater at the municipal treatment plant would produce 2.02×10^{-6} times the volume of wastewater in liters of CO_2e in Metric Tons.

5.0 FINDINGS

5.1 Project Related Construction Emissions

Utilizing the URBEMIS 2007 inputs for the model as shown in Table 4.1 above, we find that grading and construction of the project will produce approximately 6,224.41 tons of CO_2 which includes all blasting emission identified within the project Air Quality Study. The URBEMIS model outputs are provided as ***Attachment A*** to this report. Given the fact that the total emissions will ultimately contribute to 2020 cumulative levels, it is acceptable to average the total construction emission over a 30 year period (Source: SCAQMD 2008). A summary of the construction emissions is shown in Table 5.1 below.

Table 5.1: Expected Construction Emissions Summary

Year	CO_2
Construction Total (2013-2020)	6,224.41 (Includes Blasting)
Yearly Average (2020)*	**207.48 tons/year over 30 years**
Yearly Average Metric Tons (2020)*	**188.25 Metric Tons/year over 30 years**
Expected Construction emissions are based upon URBEMIS modeling assumptions identified in Chapter 4 of this report. * Total Construction related CO_2 averaged over a 30-year span. Data is presented in decimal format and may have rounding errors.	

5.2 Project Related Operation Vehicular Emissions

Based on the Project's traffic study the proposed Project could add as many as 5,578 daily trips once the Project is fully operational sometime in the year 2018. The average trip distance for the project as a whole is 8.54 miles and the URBEMIS2007 Urban assumptions. Based on this, the project would add 47,634.81 Vehicle Miles Traveled (VMT) per day or 165,292,280.24 miles per year. In order to obtain a realistic approximation of the Business as Usual (BAU) baseline emissions, Ldn Consulting ran the EMFAC 2007 model for 2020 which could be assumed to be BAU. The EMFAC modeling results are provided as ***Attachment B*** at the end of this report.

5.3 Project Related Electricity Use

Based upon the California Statewide Residential Appliance Saturation Study (2004) prepared for the California Energy Commission (CEC) the average electricity usage for a dwelling unit per year is 5,941 KWh and the Daycare facility is expected to demand energy similarly to that of an Elementary school which is estimated by SCAQMD to require 5.9KWh/SF/year. Therefore, the entire Project would be expected to use 7,772,230 KWh annually. The equivalent CO_2 emissions are calculated in Table 5.2 below.

Table 5.2: Total GHG Emissions Factors (Electricity Usage)

GHG	Emission Factor eGRID Subregion WECC California (lbs/KWh)	Energy Usage (KWh)	Conversion lbs/metric ton	Total (Metric Tons)	GWP	CO_2e (Metric Tons)
CO_2	0.72412	3,909,096.0	2,204.62	1,283.965	1	1,283.96
CH_4	0.000030	3,909,096.0	2,204.62	0.054	21	1.12
N_2O	0.0000081	3,909,096.0	2,204.62	0.014	310	4.45
Total						**1,289.54**
Note: Data is presented in decimal format and may have rounding errors.						

5.4 Project Related Natural Gas Usage

Based upon South Coast Air Quality Management District's CEQA Air Quality Handbook (1993) the average natural gas usage for a single-family residential unit is 6,665 Cubic Feet/Unit/Month and a multi-family unit is 4,011.5 Cubic Feet/Unit/Month. Therefore, the 119-Unit single family units would be expected to use 793,135 Cubic Feet per month, while the 537 multi-family units would use 2,154,175.5 Cubic Feet per month. Estimates for the Daycare facility are expected to demand less than but similar to that of a hotel which would demand as much a 4.8 CF/SF/Month for a total of 9,600 Cubic Feet per month. The project would therefore demand 35,482,926 Cubic Feet per year. Additionally, since 1MMBtu is commonly equated to 1,000 Cubic Feet of gas the project would consume 34,482.93 MMBtu of natural gas per year. The equivalent CO_2 emissions are expected to be 2,939.17 Metric Tons per year as shown in Table 5.3 below.

Table 5.3: Total GHG Emissions Factors (Natural Gas Usage)

GHG	Emission Factor kg/MMBtu	Natural Gas Usage (MMBtu)	Conversion metric ton/kg	Total (Metric Tons)	GWP	CO_2e (Metric Tons)
CO_2	53.060	35,482.93	0.001	1,882.724	1	1,882.72
CH_4	0.0050	35,482.93	0.001	0.177	21	3.73
N_2O	0.00010	35,482.93	0.001	0.004	310	1.10
Total						**1,887.55**
Note: Data is presented in decimal format and may have rounding errors.						

5.5 Project Related Solid Waste Emissions Gas Usage

Based upon methods discussed in Section 4.5 of this report, it was determined that the overall Project could generate 815.99 tons of solid waste each year. Utilizing the EPA's waste breakdown emission factors for each trash type and multiplying those factors with the projected waste generation yields estimates for equivalent CO_2 of 166.98 Metric Tons for the proposed project as shown in Table 5.4 below.

Table 5.4: Total GHG Emissions Factors (Solid Waste)

Waste Type	Residential Waste Breakdown	Residential Waste (Tons)	Commercial Waste Breakdown	Commercial Waste (Tons)	Landfill Emission Factors (MTCO2e per Ton)	Residential MTCO2e	Commercial MTCO2e
Special Waste	1.5%	12.22	9.3%	0.094	0.42	5.13	0.039
Mixed Residue	2.5%	20.37	0.1%	0.001	0.04	0.81	0.000
Paper	19.6%	159.74	5.5%	0.056	0.35	55.91	0.019
Glass	2.4%	19.56	0.5%	0.005	0.04	0.78	0.000
Metal	4.0%	32.60	5.6%	0.057	0.04	1.30	0.002
Electronics	0.7%	5.70	0.4%	0.004	0.04	0.23	0.000
Plastic	9.2%	74.98	5.8%	0.059	0.04	3.00	0.002
Other Organics	48.6%	396.08	13.6%	0.137	0.24	95.06	0.033
Inert and Other	11.2%	91.28	58.8%	0.594	0.04	3.65	0.024
HHW	0.3%	2.44	0.4%	0.004	0.40	0.98	0.002
Total MTCO2E						166.86	0.12
Combined Total $MTCO_2E$						**166.98**	

5.6 Project Related Water and Sewage Offsite Pumping Emissions Usage

Based on methods identified within Section 4.6, the proposed project would most likely require as much as 837,990.91 kWh of energy usage. Given this, the project is expected to create approximately 276.44 Metric Tons of CO_2e per year as shown in Table 5.5 on the following page. This includes energy required to process the waste given the rates from CAPCOA. Ldn Consulting assumed that the proposed Project would generate an equal level of wastewater as a worst-case assessment under CEQA.

Table 5.5: Total GHG Emissions Factors (Electricity from Water Usage)

GHG	Emission Factor eGRID Subregion WECC California (lbs/KWh)	Energy Usage (KWh)	Conversion lbs/metric ton	Total (Metric Tons)	GWP	CO_2e (Metric Tons)
CO_2	0.72412	977,279.96	2,204.62	275.24289	1	275.24289
CH_4	0.000030	977,279.96	2,204.62	0.01148	21	0.24106
N_2O	0.0000081	977,279.96	2,204.62	0.00308	310	0.95445
Total						**276.44**
Note: Data is presented in decimal format and may have rounding errors.						

5.7 Wastewater Generation Emission Calculation Methodology

Based on methods identified within Section 4.7, the project could generate at 54,604,000 Gallons or 206,698,625 liters of waste water each year. Utilizing CAPCOA's baseline CO_2e approximation, it is estimated that the project would produce 417.53 MT CO_2e. It's likely that the offsite wastewater treatment plan will burn off the methane produced by the Project which will reduce offsite emissions further. For purposes of this analysis and to be conservative, those offsite reductions were not considered.

5.8 Project Cumulative Totals

Cumulatively, the Project will emit approximately 11,118.12 Metric Tons of CO_2e each year. Per guidelines of CAPCOA's 900 Metric Ton per year threshold, the proposed Project would require design features to comply. A summary of the totals is shown in Table 5.6 below.

Table 5.6: Expected CO_2e Emissions Summary

CO_2e Generator	CO_2e (Metric Tons)
Construction	188.25
Vehicular Usage	6,891.95
Electricity Usage	1,289.54
Natural Gas Usage	1,887.55
Solid Waste Emissions	166.86
Water Usage Emissions	276.44
Wastewater Emissions	417.53
Project Totals (Business as Usual)	**11,118.12**

Expected Construction emissions are based upon URBEMIS modeling assumptions identified in Chapter 4 of this report.
* Total Construction related CO_2 averaged over a 30-year span.
Data is presented in decimal format and may have rounding errors.

Indirect Electricity and Natural Gas Design Features

Once building permits are requested, the City of Carlsbad should verify that the project design would meet the EPA's energy star compliance guidelines or other equivalent building efficiencies based on the latest available technologies and implement Title 24 2008 requirements to achieve the 20% reductions over BAU with respect to only Title 24 2005 standards. Based upon the following voluntary design features, it would be expected that the proposed project could reduce CO2e for both natural gas and electricity levels by as much as 635.42 $MTCO_2E$.

To ensure that the homes meet Energy Star guidelines, third–party verification by a certified Home Energy Rater (or equivalent) is required. The Rater works with the builder throughout the construction process to help determine the needed energy–saving equipment and construction techniques and conduct required on–site diagnostic testing and inspections to document that the home is eligible to earn the Energy Star label. Additionally, Residential buildings will provide a space for recharge of batteries for both small (hand-held) and large (e.g., electric lawnmower or car) equipment (laundry rooms and garages).

Electrical Utility Reduction Measures

The goals of SDGE (the proposed projects energy provider) are suggesting that 33% of the energy supplied to their customers would be from renewable sources by 2020. However, under the BAU percentage reduction strategy of this report it is assumed that the utilities will increase renewable sources an additional 29% over the BAU starting period. Therefore, the Project GHG emissions related to Electricity usage would drop by as much as 373.97 $MTCO_2E$ (Source: http://www.sdge.com/documents/aboutus/RegionalEnergyPlan.pdf).

Additionally, it should be noted that water conveyance is primarily through the use of electricity. Therefore, emissions generated from water conveyance would also be expected to decrease by an addition 29% in 2020 which would drop the overall project related emissions from water conveyance by 80.17 $MTCO_2E$ for a total reduction of 454.13 $MTCO_2E$.

5.9 Conclusions

Combining all regulatory measures such as the Pavley, Low Carbon Fuel Standards and both the EPA Energy Star compliance standards and Cal Green standards as well as implementing Neighborhood design features such as sidewalks and bike paths, the project would be expected to reduce CO_2e by 3,501.73 Metric Tons compared to Business as Usual. A reduction of this size would reduce the projects emissions from business as usual by 31.50% which will meet and exceed the requirements of CEQA. Therefore, the project conforms to the goals of AB 32 and would not result in any direct impacts and cumulative impacts would be reduced to a level that is less than significant. No additional analysis is required. Table 5.7 below summarizes the reductions and identifies if the reduction is from regulatory measures or from project specific reductions.

Table 5.7: Year 2020 Total GHG Emissions over BAU

Reduction Strategy	CO_2e Generator or Reduction Measure	CO_2e Reduction (Metric Tons)	Total BAU (Metric Tons)
BAU	Construction Related CO2 - BAU		188.25
BAU	Offsite Vehicular CO2e Emissions - BAU		6,891.95
Regulatory	CAFE and Pavley standards Combined (20%)	-1,378.39	
Regulatory	California Low Carbon Fuel Standard (10%)	-689.19	
Project Design	Sidewalks, Bike Paths, bus stop and Workability	-344.60	
BAU	Indirect Electricity Usage - BAU		1,289.54
Regulatory	Year 2020 Renewable Energy Generation by Utility (29%)	-373.97	
Project Design	Building Efficiencies and Cal Green for Electricity Usage	-257.91	
BAU	Natural Gas Usage - BAU		1,887.55
Project Design	Building Efficiencies and Cal Green for Natural Gas Usage	-377.51	
BAU	Solid Waste Generation - BAU		166.86
BAU	Water Usage - BAU		276.44
BAU	Wastewater CH_4		417.53
Regulatory	Year 2020 Renewable Energy Generation by Water Utility (29%)	-80.17	
	Summation	-3,501.73	11,118.12
	Combined Total	**7,616.38**	
	Combined CO_2e Reduction (%)	**31.50%**	
Note: Data is presented in decimal format and may have rounding errors.			

6.0 CERTIFICATIONS

The contents of this report represent an accurate depiction of the projected CO_2e emissions from the proposed Quarry Creek development at the time of preparation. This report was prepared utilizing the latest emission rates, the best available information and reduction methodologies.

DRAFT

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Date October 5, 2012

ATTACHMENT A

URBEMIS 2007

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Jeremy 8-5-12\Quarry Creek\Quarry Creek.urb924

Project Name: Quarry Creek Mixed Use Development

Project Location: California State-wide

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2014 TOTALS (tons/year unmitigated)	1.15	9.58	4.70	0.00	40.64	0.38	41.03	8.49	0.35	8.84	1,240.36
2014 TOTALS (tons/year mitigated)	1.15	9.58	4.70	0.00	4.86	0.38	5.24	1.01	0.35	1.37	1,240.36
Percent Reduction	0.00	0.00	0.00	0.00	88.04	0.00	87.22	88.07	0.00	84.55	0.00
2015 TOTALS (tons/year unmitigated)	2.19	3.94	6.77	0.01	0.04	0.23	0.27	0.01	0.21	0.22	1,186.10
2015 TOTALS (tons/year mitigated)	2.19	3.94	6.77	0.01	0.04	0.23	0.27	0.01	0.21	0.22	1,186.10
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2016 TOTALS (tons/year unmitigated)	3.62	3.43	7.51	0.01	0.05	0.20	0.25	0.02	0.18	0.20	1,359.00
2016 TOTALS (tons/year mitigated)	3.62	3.43	7.51	0.01	0.05	0.20	0.25	0.02	0.18	0.20	1,359.00
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2017 TOTALS (tons/year unmitigated)	3.55	3.13	7.04	0.01	0.05	0.18	0.23	0.02	0.16	0.18	1,353.83

2017 TOTALS (tons/year mitigated)	3.55	3.13	7.04	0.01	0.05	0.18	0.23	0.02	0.16	0.18	1,353.83
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2018 TOTALS (tons/year unmitigated)	2.64	2.15	5.01	0.01	0.04	0.12	0.16	0.01	0.11	0.12	1,020.60
2018 TOTALS (tons/year mitigated)	2.64	2.15	5.01	0.01	0.04	0.12	0.16	0.01	0.11	0.12	1,020.60
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	6.60	1.70	1.75	0.00	0.00	0.00	2,160.08

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	5.46	7.41	60.17	0.08	14.90	2.88	8,099.03

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	12.06	9.11	61.92	0.08	14.90	2.88	10,259.11

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2014	1.15	9.58	4.70	0.00	40.64	0.38	41.03	8.49	0.35	8.84	1,240.36
Mass Grading 01/01/2014-02/23/2014	0.35	2.97	1.37	0.00	14.30	0.12	14.41	2.99	0.11	3.09	368.62
Mass Grading Dust	0.00	0.00	0.00	0.00	14.30	0.00	14.30	2.99	0.00	2.99	0.00
Mass Grading Off Road Diesel	0.35	2.96	1.31	0.00	0.00	0.11	0.11	0.00	0.11	0.11	361.22
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.41
Mass Grading 02/24/2014-03/07/2014	0.06	0.43	0.22	0.00	3.76	0.02	3.78	0.79	0.02	0.80	78.24
Mass Grading Dust	0.00	0.00	0.00	0.00	3.76	0.00	3.76	0.79	0.00	0.79	0.00
Mass Grading Off Road Diesel	0.05	0.43	0.21	0.00	0.00	0.02	0.02	0.00	0.02	0.02	76.29
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.95
Fine Grading 03/08/2014-05/31/2014	0.55	4.70	2.16	0.00	22.58	0.18	22.76	4.72	0.17	4.88	584.79
Fine Grading Dust	0.00	0.00	0.00	0.00	22.58	0.00	22.58	4.72	0.00	4.72	0.00
Fine Grading Off Road Diesel	0.55	4.70	2.07	0.00	0.00	0.18	0.18	0.00	0.17	0.17	573.10
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.70
Trenching 06/01/2014-04/01/2015	0.19	1.48	0.95	0.00	0.00	0.07	0.07	0.00	0.06	0.06	208.71
Trenching Off Road Diesel	0.19	1.48	0.87	0.00	0.00	0.07	0.07	0.00	0.06	0.06	197.52
Trenching Worker Trips	0.00	0.01	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.19

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2015	2.19	3.94	6.77	0.01	0.04	0.23	0.27	0.01	0.21	0.22	1,186.10
Trenching 06/01/2014-04/01/2015	0.07	0.56	0.40	0.00	0.00	0.03	0.03	0.00	0.03	0.03	88.67
Trenching Off Road Diesel	0.07	0.56	0.37	0.00	0.00	0.03	0.03	0.00	0.03	0.03	83.91
Trenching Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.75
Asphalt 02/15/2015-04/01/2015	0.08	0.54	0.35	0.00	0.00	0.03	0.03	0.00	0.03	0.03	72.54
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.07	0.52	0.31	0.00	0.00	0.03	0.03	0.00	0.03	0.03	63.37
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.34
Paving Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.83
Building 04/01/2015-10/01/2018	0.52	2.84	6.00	0.01	0.04	0.17	0.21	0.01	0.15	0.17	1,023.17
Building Off Road Diesel	0.34	1.89	1.51	0.00	0.00	0.13	0.13	0.00	0.12	0.12	249.86
Building Vendor Trips	0.06	0.73	0.66	0.00	0.01	0.03	0.04	0.00	0.03	0.03	236.27
Building Worker Trips	0.12	0.22	3.83	0.00	0.03	0.02	0.04	0.01	0.01	0.02	537.04
Coating 07/01/2015-10/01/2018	1.51	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.72
Architectural Coating	1.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.72
2016	3.62	3.43	7.51	0.01	0.05	0.20	0.25	0.02	0.18	0.20	1,359.00
Building 04/01/2015-10/01/2018	0.63	3.43	7.49	0.01	0.05	0.20	0.25	0.02	0.18	0.20	1,355.60
Building Off Road Diesel	0.41	2.31	1.97	0.00	0.00	0.15	0.15	0.00	0.14	0.14	331.03
Building Vendor Trips	0.08	0.86	0.81	0.00	0.01	0.03	0.04	0.00	0.03	0.03	313.04
Building Worker Trips	0.15	0.27	4.70	0.01	0.04	0.02	0.06	0.01	0.02	0.03	711.53
Coating 07/01/2015-10/01/2018	2.99	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.40
Architectural Coating	2.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.40

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2017	3.55	3.13	7.04	0.01	0.05	0.18	0.23	0.02	0.16	0.18	1,353.83
Building 04/01/2015-10/01/2018	0.58	3.13	7.02	0.01	0.05	0.18	0.23	0.02	0.16	0.18	1,350.44
Building Off Road Diesel	0.37	2.13	1.93	0.00	0.00	0.13	0.13	0.00	0.12	0.12	329.76
Building Vendor Trips	0.07	0.76	0.76	0.00	0.01	0.03	0.04	0.00	0.03	0.03	311.86
Building Worker Trips	0.13	0.24	4.34	0.01	0.04	0.02	0.06	0.01	0.02	0.03	708.83
Coating 07/01/2015-10/01/2018	2.98	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.39
Architectural Coating	2.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.39
2018	2.64	2.15	5.01	0.01	0.04	0.12	0.16	0.01	0.11	0.12	1,020.60
Building 04/01/2015-10/01/2018	0.39	2.15	4.99	0.01	0.04	0.12	0.16	0.01	0.11	0.12	1,018.05
Building Off Road Diesel	0.25	1.48	1.43	0.00	0.00	0.08	0.08	0.00	0.08	0.08	248.59
Building Vendor Trips	0.05	0.51	0.53	0.00	0.01	0.02	0.03	0.00	0.02	0.02	235.10
Building Worker Trips	0.09	0.17	3.03	0.00	0.03	0.01	0.04	0.01	0.01	0.02	534.36
Coating 07/01/2015-10/01/2018	2.24	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.55
Architectural Coating	2.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.55

Phase Assumptions

Phase: Fine Grading 3/8/2014 - 5/31/2014 - Fine Grading

Total Acres Disturbed: 74

Maximum Daily Acreage Disturbed: 8

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 5700 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

2 Other Material Handling Equipment (191 hp) operating at a 0.59 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

8 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

3 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 1/1/2014 - 2/23/2014 - Mass Grading

Total Acres Disturbed: 74

Maximum Daily Acreage Disturbed: 8

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 5700 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

2 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

8 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

3 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 2/24/2014 - 3/7/2014 - Mass Grading with Blasting

Total Acres Disturbed: 74

Maximum Daily Acreage Disturbed: 8

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 5700 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

3 Bore/Drill Rigs (291 hp) operating at a 0.75 load factor for 8 hours per day

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

6 Off Highway Trucks (600 hp) operating at a 0.57 load factor for 4 hours per day

1 Other Material Handling Equipment (191 hp) operating at a 0.59 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

2 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 6/1/2014 - 4/1/2015 - Trenching Activities

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 4 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 2/15/2015 - 4/1/2015 - Paving Activities

Acres to be Paved: 7.5

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 4 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 4 hours per day

Phase: Building Construction 4/1/2015 - 10/1/2018 - Building Construction

Off-Road Equipment:

1 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day

1 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 7 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Rough Terrain Forklifts (93 hp) operating at a 0.6 load factor for 8 hours per day

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2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 7/1/2015 - 10/1/2018 - Architectural Coating

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2014	1.15	9.58	4.70	0.00	4.86	0.38	5.24	1.01	0.35	1.37	1,240.36
Mass Grading 01/01/2014-02/23/2014	0.35	2.97	1.37	0.00	1.71	0.12	1.83	0.36	0.11	0.46	368.62
Mass Grading Dust	0.00	0.00	0.00	0.00	1.71	0.00	1.71	0.36	0.00	0.36	0.00
Mass Grading Off Road Diesel	0.35	2.96	1.31	0.00	0.00	0.11	0.11	0.00	0.11	0.11	361.22
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.41
Mass Grading 02/24/2014-03/07/2014	0.06	0.43	0.22	0.00	0.45	0.02	0.47	0.09	0.02	0.11	78.24
Mass Grading Dust	0.00	0.00	0.00	0.00	0.45	0.00	0.45	0.09	0.00	0.09	0.00
Mass Grading Off Road Diesel	0.05	0.43	0.21	0.00	0.00	0.02	0.02	0.00	0.02	0.02	76.29
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.95
Fine Grading 03/08/2014-05/31/2014	0.55	4.70	2.16	0.00	2.70	0.18	2.88	0.56	0.17	0.73	584.79
Fine Grading Dust	0.00	0.00	0.00	0.00	2.70	0.00	2.70	0.56	0.00	0.56	0.00
Fine Grading Off Road Diesel	0.55	4.70	2.07	0.00	0.00	0.18	0.18	0.00	0.17	0.17	573.10
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.70
Trenching 06/01/2014-04/01/2015	0.19	1.48	0.95	0.00	0.00	0.07	0.07	0.00	0.06	0.06	208.71
Trenching Off Road Diesel	0.19	1.48	0.87	0.00	0.00	0.07	0.07	0.00	0.06	0.06	197.52
Trenching Worker Trips	0.00	0.01	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.19

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2015	2.19	3.94	6.77	0.01	0.04	0.23	0.27	0.01	0.21	0.22	1,186.10
Trenching 06/01/2014-04/01/2015	0.07	0.56	0.40	0.00	0.00	0.03	0.03	0.00	0.03	0.03	88.67
Trenching Off Road Diesel	0.07	0.56	0.37	0.00	0.00	0.03	0.03	0.00	0.03	0.03	83.91
Trenching Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.75
Asphalt 02/15/2015-04/01/2015	0.08	0.54	0.35	0.00	0.00	0.03	0.03	0.00	0.03	0.03	72.54
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.07	0.52	0.31	0.00	0.00	0.03	0.03	0.00	0.03	0.03	63.37
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.34
Paving Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.83
Building 04/01/2015-10/01/2018	0.52	2.84	6.00	0.01	0.04	0.17	0.21	0.01	0.15	0.17	1,023.17
Building Off Road Diesel	0.34	1.89	1.51	0.00	0.00	0.13	0.13	0.00	0.12	0.12	249.86
Building Vendor Trips	0.06	0.73	0.66	0.00	0.01	0.03	0.04	0.00	0.03	0.03	236.27
Building Worker Trips	0.12	0.22	3.83	0.00	0.03	0.02	0.04	0.01	0.01	0.02	537.04
Coating 07/01/2015-10/01/2018	1.51	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.72
Architectural Coating	1.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.72
2016	3.62	3.43	7.51	0.01	0.05	0.20	0.25	0.02	0.18	0.20	1,359.00
Building 04/01/2015-10/01/2018	0.63	3.43	7.49	0.01	0.05	0.20	0.25	0.02	0.18	0.20	1,355.60
Building Off Road Diesel	0.41	2.31	1.97	0.00	0.00	0.15	0.15	0.00	0.14	0.14	331.03
Building Vendor Trips	0.08	0.86	0.81	0.00	0.01	0.03	0.04	0.00	0.03	0.03	313.04
Building Worker Trips	0.15	0.27	4.70	0.01	0.04	0.02	0.06	0.01	0.02	0.03	711.53
Coating 07/01/2015-10/01/2018	2.99	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.40
Architectural Coating	2.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.40

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2017	3.55	3.13	7.04	0.01	0.05	0.18	0.23	0.02	0.16	0.18	1,353.83
Building 04/01/2015-10/01/2018	0.58	3.13	7.02	0.01	0.05	0.18	0.23	0.02	0.16	0.18	1,350.44
Building Off Road Diesel	0.37	2.13	1.93	0.00	0.00	0.13	0.13	0.00	0.12	0.12	329.76
Building Vendor Trips	0.07	0.76	0.76	0.00	0.01	0.03	0.04	0.00	0.03	0.03	311.86
Building Worker Trips	0.13	0.24	4.34	0.01	0.04	0.02	0.06	0.01	0.02	0.03	708.83
Coating 07/01/2015-10/01/2018	2.98	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.39
Architectural Coating	2.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.39
2018	2.64	2.15	5.01	0.01	0.04	0.12	0.16	0.01	0.11	0.12	1,020.60
Building 04/01/2015-10/01/2018	0.39	2.15	4.99	0.01	0.04	0.12	0.16	0.01	0.11	0.12	1,018.05
Building Off Road Diesel	0.25	1.48	1.43	0.00	0.00	0.08	0.08	0.00	0.08	0.08	248.59
Building Vendor Trips	0.05	0.51	0.53	0.00	0.01	0.02	0.03	0.00	0.02	0.02	235.10
Building Worker Trips	0.09	0.17	3.03	0.00	0.03	0.01	0.04	0.01	0.01	0.02	534.36
Coating 07/01/2015-10/01/2018	2.24	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.55
Architectural Coating	2.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.55

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 3/8/2014 - 5/31/2014 - Fine Grading

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 51% PM25: 51.5%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

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PM10: 51% PM25: 51%

The following mitigation measures apply to Phase: Mass Grading 1/1/2014 - 2/23/2014 - Mass Grading

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 51% PM25: 51%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 51% PM25: 51%

The following mitigation measures apply to Phase: Mass Grading 2/24/2014 - 3/7/2014 - Mass Grading with Blasting

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 51% PM25: 51%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 51% PM25: 51%

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.13	1.69	0.72	0.00	0.00	0.00	2,155.77
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	2.53
Landscape	0.13	0.01	1.03	0.00	0.00	0.00	1.78
Consumer Products	5.86						
Architectural Coatings	0.48						
TOTALS (tons/year, unmitigated)	6.60	1.70	1.75	0.00	0.00	0.00	2,160.08

Area Source Changes to Defaults

Percent residential using natural gas changed from 60% to 100%

Percentage of residences with wood stoves changed from 35% to 0%

Percentage of residences with wood fireplaces changed from 10% to 0%

Percentage of residences with natural gas fireplaces changed from 55% to 100%

Cords of wood burned per year per wood stove changed from 1.48 cords per year to 0.5 cords per year

Days used per year per wood stove changed from 82 days to 30 days

Cords of wood burned per year per wood fireplace changed from 0.28 cords per year to 0.25 cords per year

Days used per year per wood stove changed from 82 days to 30 days

The residential percentage of surface area repainted each year changed from 10% to 5%

The nonresidential percentage of surface area repainted each year changed from 10% to 5%

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Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Single family housing	1.15	1.59	12.95	0.02	3.20	0.62	1,740.67
Apartments low rise	0.61	0.79	6.47	0.01	1.60	0.31	868.87
Condo/townhouse general	3.46	4.69	38.14	0.05	9.43	1.82	5,125.47
Day-care center	0.11	0.18	1.36	0.00	0.35	0.07	189.42
Blank (Edit this description)	0.13	0.16	1.25	0.00	0.32	0.06	174.60
TOTALS (tons/year, unmitigated)	5.46	7.41	60.17	0.08	14.90	2.88	8,099.03

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2016 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	14.80	10.00	dwelling units	119.00	1,190.00	10,174.14
Apartments low rise	5.50	6.00	dwelling units	99.00	594.00	5,078.52
Condo/townhouse general	21.20	8.00	dwelling units	438.00	3,504.00	29,958.15
Day-care center		75.00	1000 sq ft	2.00	150.00	1,118.62
Blank (Edit this description)		5.00	unknown	28.00	140.00	1,032.01
					5,578.00	47,361.44

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	48.4	0.2	99.6	0.2
Light Truck < 3750 lbs	10.8	0.9	95.4	3.7
Light Truck 3751-5750 lbs	21.9	0.0	100.0	0.0
Med Truck 5751-8500 lbs	9.7	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.7	0.0	76.5	23.5
Lite-Heavy Truck 10,001-14,000 lbs	0.7	0.0	57.1	42.9
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.9	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	3.6	47.2	52.8	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.0	0.0	90.0	10.0

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			

8/21/2012 6:32:21 AM

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
% of Trips - Commercial (by land use)						
Day-care center				5.0	2.5	92.5
Blank (Edit this description)				1.0	0.5	98.5

Operational Changes to Defaults

Ambient summer temperature changed from 85 degrees F to 80 degrees F

Ambient winter temperature changed from 40 degrees F to 60 degrees F

ATTACHMENT B

EMFAC2007 2020 input/output

state average
Title   : 2020 BAU
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/30 08:43:07
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season   : Annual
Area   : San Diego
****
Year: 2020 -- Model Years 1976 to 2020 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 1: Running Exhaust Emissions (grams/mile)

Pollutant Name: Methane Temperature: 60F Relative Humidity: 60%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
30	0.013	0.017	0.000	0.000	0.000	0.000	0.014
35	0.011	0.015	0.000	0.000	0.000	0.000	0.013

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 60%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
30	1.305	1.645	0.000	0.000	0.000	0.000	1.440
35	1.206	1.519	0.000	0.000	0.000	0.000	1.330

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 60%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
30	0.137	0.176	0.000	0.000	0.000	0.000	0.153
35	0.130	0.168	0.000	0.000	0.000	0.000	0.145

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 60%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
30	333.683	423.325	0.000	0.000	0.000	0.000	369.232
35	303.711	385.409	0.000	0.000	0.000	0.000	336.109

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 60%

state average

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
30	0.003	0.004	0.000	0.000	0.000	0.000	0.004
35	0.003	0.004	0.000	0.000	0.000	0.000	0.003

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 60%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
30	0.011	0.025	0.000	0.000	0.000	0.000	0.017
35	0.010	0.021	0.000	0.000	0.000	0.000	0.014

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 60%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
30	0.008	0.008	0.000	0.000	0.000	0.000	0.008
35	0.008	0.008	0.000	0.000	0.000	0.000	0.008

Pollutant Name: PM10 - Brake Wear Temperature: 60F Relative Humidity: 60%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
30	0.013	0.013	0.000	0.000	0.000	0.000	0.013
35	0.013	0.013	0.000	0.000	0.000	0.000	0.013

Pollutant Name: Gasoline - mi/gal Temperature: 60F Relative Humidity: 60%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
30	26.382	20.784	0.000	0.000	0.000	0.000	24.167
35	28.986	22.835	0.000	0.000	0.000	0.000	26.552

Pollutant Name: Diesel - mi/gal Temperature: 60F Relative Humidity: 60%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
30	28.569	29.080	0.000	0.000	0.000	0.000	28.998
35	28.569	29.080	0.000	0.000	0.000	0.000	28.998

Title   : 2020 BAU
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/30 08:43:07
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season   : Annual
Area   : San Diego
****
Year: 2020 -- Model Years 1976 to 2020 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego   Basin Average   Basin Average

Table 2: Starting Emissions (grams/trip)

Pollutant Name: Methane   Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.002	0.002	0.000	0.000	0.000	0.000	0.002
10	0.004	0.003	0.000	0.000	0.000	0.000	0.004
20	0.008	0.007	0.000	0.000	0.000	0.000	0.007
30	0.011	0.009	0.000	0.000	0.000	0.000	0.010
40	0.014	0.012	0.000	0.000	0.000	0.000	0.013
50	0.016	0.014	0.000	0.000	0.000	0.000	0.016
60	0.018	0.017	0.000	0.000	0.000	0.000	0.018
120	0.024	0.023	0.000	0.000	0.000	0.000	0.024
180	0.019	0.018	0.000	0.000	0.000	0.000	0.018
240	0.020	0.019	0.000	0.000	0.000	0.000	0.020
300	0.021	0.020	0.000	0.000	0.000	0.000	0.021
360	0.022	0.022	0.000	0.000	0.000	0.000	0.022
420	0.023	0.023	0.000	0.000	0.000	0.000	0.023
480	0.024	0.024	0.000	0.000	0.000	0.000	0.024
540	0.025	0.025	0.000	0.000	0.000	0.000	0.025
600	0.026	0.026	0.000	0.000	0.000	0.000	0.026
660	0.026	0.027	0.000	0.000	0.000	0.000	0.027
720	0.027	0.028	0.000	0.000	0.000	0.000	0.027

Pollutant Name: Carbon Monoxide   Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.426	0.450	0.000	0.000	0.000	0.000	0.436
10	0.838	0.886	0.000	0.000	0.000	0.000	0.856
20	1.617	1.719	0.000	0.000	0.000	0.000	1.656
30	2.339	2.498	0.000	0.000	0.000	0.000	2.401
40	3.003	3.226	0.000	0.000	0.000	0.000	3.089
50	3.610	3.901	0.000	0.000	0.000	0.000	3.722
60	4.159	4.523	0.000	0.000	0.000	0.000	4.300
120	5.918	6.538	0.000	0.000	0.000	0.000	6.157

state average

180	4.104	4.737	0.000	0.000	0.000	0.000	4.349
240	4.338	5.076	0.000	0.000	0.000	0.000	4.623
300	4.554	5.380	0.000	0.000	0.000	0.000	4.873
360	4.751	5.649	0.000	0.000	0.000	0.000	5.098
420	4.930	5.884	0.000	0.000	0.000	0.000	5.298
480	5.090	6.084	0.000	0.000	0.000	0.000	5.474
540	5.232	6.250	0.000	0.000	0.000	0.000	5.625
600	5.356	6.381	0.000	0.000	0.000	0.000	5.751
660	5.461	6.477	0.000	0.000	0.000	0.000	5.853
720	5.548	6.538	0.000	0.000	0.000	0.000	5.930

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.103	0.216	0.000	0.000	0.000	0.000	0.147
10	0.120	0.236	0.000	0.000	0.000	0.000	0.165
20	0.150	0.271	0.000	0.000	0.000	0.000	0.197
30	0.174	0.301	0.000	0.000	0.000	0.000	0.223
40	0.194	0.325	0.000	0.000	0.000	0.000	0.245
50	0.208	0.344	0.000	0.000	0.000	0.000	0.260
60	0.217	0.357	0.000	0.000	0.000	0.000	0.271
120	0.228	0.383	0.000	0.000	0.000	0.000	0.287
180	0.236	0.396	0.000	0.000	0.000	0.000	0.298
240	0.234	0.393	0.000	0.000	0.000	0.000	0.296
300	0.232	0.389	0.000	0.000	0.000	0.000	0.293
360	0.229	0.383	0.000	0.000	0.000	0.000	0.288
420	0.225	0.375	0.000	0.000	0.000	0.000	0.283
480	0.220	0.365	0.000	0.000	0.000	0.000	0.276
540	0.214	0.354	0.000	0.000	0.000	0.000	0.268
600	0.208	0.341	0.000	0.000	0.000	0.000	0.259
660	0.200	0.326	0.000	0.000	0.000	0.000	0.249
720	0.192	0.309	0.000	0.000	0.000	0.000	0.237

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	11.569	14.677	0.000	0.000	0.000	0.000	12.769
10	13.259	16.776	0.000	0.000	0.000	0.000	14.617
20	17.095	21.555	0.000	0.000	0.000	0.000	18.817
30	21.538	27.109	0.000	0.000	0.000	0.000	23.688
40	26.588	33.437	0.000	0.000	0.000	0.000	29.232
50	32.247	40.540	0.000	0.000	0.000	0.000	35.448
60	38.512	48.418	0.000	0.000	0.000	0.000	42.336
120	87.451	110.293	0.000	0.000	0.000	0.000	96.269
180	99.548	125.505	0.000	0.000	0.000	0.000	109.569
240	111.561	140.621	0.000	0.000	0.000	0.000	122.780
300	123.492	155.642	0.000	0.000	0.000	0.000	135.903
360	135.338	170.569	0.000	0.000	0.000	0.000	148.939
420	147.101	185.400	0.000	0.000	0.000	0.000	161.887
480	158.781	200.136	0.000	0.000	0.000	0.000	174.746
540	170.377	214.777	0.000	0.000	0.000	0.000	187.518
600	181.890	229.323	0.000	0.000	0.000	0.000	200.202
660	193.319	243.775	0.000	0.000	0.000	0.000	212.798

state average

720	204.665	258.131	0.000	0.000	0.000	0.000	225.305

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60	0.000	0.001	0.000	0.000	0.000	0.000	0.000
120	0.001	0.001	0.000	0.000	0.000	0.000	0.001
180	0.001	0.001	0.000	0.000	0.000	0.000	0.001
240	0.001	0.001	0.000	0.000	0.000	0.000	0.001
300	0.001	0.002	0.000	0.000	0.000	0.000	0.001
360	0.001	0.002	0.000	0.000	0.000	0.000	0.002
420	0.001	0.002	0.000	0.000	0.000	0.000	0.002
480	0.002	0.002	0.000	0.000	0.000	0.000	0.002
540	0.002	0.002	0.000	0.000	0.000	0.000	0.002
600	0.002	0.002	0.000	0.000	0.000	0.000	0.002
660	0.002	0.002	0.000	0.000	0.000	0.000	0.002
720	0.002	0.003	0.000	0.000	0.000	0.000	0.002

Pollutant Name: PM10 Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.001	0.001	0.000	0.000	0.000	0.000	0.001
10	0.001	0.003	0.000	0.000	0.000	0.000	0.002
20	0.002	0.005	0.000	0.000	0.000	0.000	0.003
30	0.003	0.007	0.000	0.000	0.000	0.000	0.005
40	0.005	0.010	0.000	0.000	0.000	0.000	0.007
50	0.006	0.012	0.000	0.000	0.000	0.000	0.008
60	0.006	0.014	0.000	0.000	0.000	0.000	0.009
120	0.010	0.022	0.000	0.000	0.000	0.000	0.015
180	0.011	0.025	0.000	0.000	0.000	0.000	0.016
240	0.012	0.027	0.000	0.000	0.000	0.000	0.018
300	0.013	0.029	0.000	0.000	0.000	0.000	0.019
360	0.014	0.030	0.000	0.000	0.000	0.000	0.020
420	0.015	0.032	0.000	0.000	0.000	0.000	0.021
480	0.015	0.033	0.000	0.000	0.000	0.000	0.022
540	0.015	0.034	0.000	0.000	0.000	0.000	0.022
600	0.016	0.034	0.000	0.000	0.000	0.000	0.023
660	0.016	0.035	0.000	0.000	0.000	0.000	0.023
720	0.016	0.035	0.000	0.000	0.000	0.000	0.023

state average
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/30 08:43:07
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season   : Annual
Area   : San Diego
****
*****
Year: 2020 -- Model Years 1976 to 2020 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego   Basin Average   Basin
Average

Table   4: Hot Soak Emissions (grams/trip)

Pollutant Name: Methane   Temperature: 60F Relative Humidity:
ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
5	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Hot soak results are scaled to reflect zero emissions for trip lengths of less than
5 minutes (about 25% of in-use trips).

Title   : 2020 BAU
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/30 08:43:07
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season   : Annual
Area   : San Diego
****
*****
Year: 2020 -- Model Years 1976 to 2020 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego   Basin Average   Basin
Average

Table 5a: Partial Day Diurnal Loss Emissions
(grams/hour)

Pollutant Name: Methane   Temperature: ALL   Relative Humidity:
ALL

Temp degF	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
60	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Title   : 2020 BAU
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/30 08:43:07
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season   : Annual
Area   : San Diego
****

Year: 2020 -- Model Years 1976 to 2020 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 5b: Multi-Day Diurnal Loss Emissions (grams/hour)

Pollutant Name: Methane Temperature: ALL Relative Humidity: ALL

Temp degF	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
60	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Title   : 2020 BAU
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/30 08:43:07
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season   : Annual
Area   : San Diego
****

Year: 2020 -- Model Years 1976 to 2020 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego Basin Average Basin Average

Table 6a: Partial Day Resting Loss Emissions (grams/hour)

Pollutant Name: Methane Temperature: ALL Relative Humidity: ALL

Temp degF	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
60	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Title   : 2020 BAU
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/30 08:43:07
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season   : Annual
Area   : San Diego
****

Year: 2020 -- Model Years 1976 to 2020 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego   Basin Average   Basin Average

Table 6b: Multi-Day Resting Loss Emissions (grams/hour)

Pollutant Name: Methane   Temperature: ALL   Relative Humidity: ALL

Temp degF	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
60	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Title   : 2020 BAU
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/30 08:43:07
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season   : Annual
Area   : San Diego
****

Year: 2020 -- Model Years 1976 to 2020 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego   Basin Average   Basin Average

Table 7: Estimated Travel Fractions

Pollutant Name: Temperature: ALL   Relative Humidity: ALL

	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
%VMT	0.603	0.397	0.000	0.000	0.000	0.000	1.000
%TRIP	0.614	0.386	0.000	0.000	0.000	0.000	1.000
%VEH	0.612	0.388	0.000	0.000	0.000	0.000	1.000

Title   : 2020 BAU
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2011/10/30 08:43:07
Scen Year: 2020 -- All model years in the range 1976 to 2020 selected
Season   : Annual
Area   : San Diego
****

Year: 2020 -- Model Years 1976 to 2020 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

San Diego   Basin Average   Basin Average

Table 8: Evaporative Running Loss Emissions (grams/minute)

Pollutant Name: Methane   Temperature: 60F Relative Humidity: ALL

Time min	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45	0.000	0.000	0.000	0.000	0.000	0.000	0.000
50	0.000	0.000	0.000	0.000	0.000	0.000	0.000
55	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60	0.000	0.000	0.000	0.000	0.000	0.000	0.000